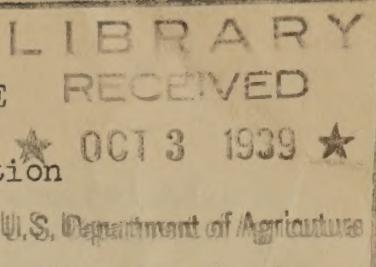


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UNITED STATES DEPARTMENT OF AGRICULTURE
" FARM SECURITY ADMINISTRATION
Resettlement Division — Cooperative Section



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Selection and Use of Water Softeners and Soap

Part 1. Subject Matter

General Points for Discussion by the Purchasers 1/

Possible Improvements in Washing Practices Few farm families spend less than \$15 yearly for laundry soap. In most cases the soap is used not only for making suds which facilitate the removal of the dirt and grease from the clothes, but the soap is also used to soften the water. However, trisodium phosphate, washing soda, and other softening agencies are far more effective means for softening water and are much cheaper than soap.

The cost of washing in many instances can be further reduced by the selection of soap according to specifications (providing these specifications are based upon conditions of use) rather than depending only upon the unsubstantiated statement of a dealer. Specifications for each of the types of soap such as laundry, chip, toilet, grit, etc., as set up for Government use will vary little, if any, from the specifications needed for corresponding family use.

Following is a list of Federal specifications for soaps commonly used in the home and for trisodium phosphate. Copies can be obtained from the Superintendent of Documents, Washington, D.C.

Soap - Laundry (powdered)	P. S. 596	5¢
Soap - Chips	P. S. 566	5¢
Soap - Laundry, Ordinary	P. S. 591	5¢
Soap - Toilet, milled	P. S. 621	5¢
Soap - Toilet, floating, white	P. S. 616	5¢
Soap - Grit, hand	P. S. 576	5¢
Soap - Grit, cake	P. S. 571	5¢
Powder - Scouring	P. P. 591	5¢
Powder - Scouring	P. P. 596	5¢
Trisodium Phosphate	O. T. 671	5¢
Washing Soda	P. S. 641	5¢

(See detailed discussion on page 7 for laundry and chip soap)

Federal specifications for laundry soaps and softeners are good starting points for making economic and satisfactory purchases. However, each homemaker can and should check the value of these specifications in her own home by comparing results in the use of the soap with other kinds of soap both as to the amount used and the cost.

The cost of washing for some families can be reduced by changes in their methods of washing as well as in the use of most efficient soap and softener.

1/ General suggestions for use of consumer or dealer

There may be only a small saving in money and energy required in doing the family laundry through the wiser selection of softener and soap and from improved methods; but the saving, although small, may be a means for providing other much needed commodities. For example, with a saving of \$2.40 a year, a \$30 washing machine can be purchased when it is possible to make a F.S.A. amortized loan for 20 years at 5%.

Washing Problems Basis For Selecting and Using Soap and Softeners Every efficient buyer must consider such questions as the following:

1. What is the hardness of the water and how can it best be softened?
2. What kinds of fabrics are to be washed?
3. What kind of dirt and soil must be removed?
4. Are the clothes washed by hand; by hand-operating washing machine; or by a power machine?

Water Softening 2/

Water when softened by the use of chemicals such as trisodium phosphate, washing soda, or lye which precipitate out the hard elements, should never be used for drinking or for cooking.

Use of Trisodium Phosphate in Softening Water

Trisodium Phosphate is recommended as an economical and efficient water softener at a low cost which presents a minimum of accident hazards in handling. In some localities it may not be available in local stores, but it can usually be obtained from a creamery or ice cream factory. In barrel lots it costs about 3¢ a pound. It is sold in packages under trade names for 10¢ to 20¢ a pound.

Methods of Determining Amount of Trisodium Phosphate to Use

- a. Standard Soap Solution. Either buy a "standard soap solution" or prepare it. To prepare it: Put one tablespoon of rubbing alcohol in a small bottle and add one teaspoon of finely shaved good quality castile soap, or as much as will completely dissolve without jelly forming after it stands.
- b. Determination of Water Hardness. Fill a 2 or 3 oz. bottle one-half full of water. Mark the water level by scratching the glass with a file or pasting on a label. Add 2 drops of the soap solution, shake bottle vigorously and place on side. Observe whether the suds form an unbroken layer on top of the water and remain that way for one minute by the clock. If the suds do not stand up, repeat process, adding one drop of soap solution at a time until the desired lather is formed. The number of drops will be equivalent to approximate hardness of water.
- c. Amount of trisodium phosphate required to soften water of various degrees of hardness. Trisodium phosphate crystals should be dissolved in water in the ratio of one pound to one quart of water.

Table - Trisodium Phosphate Required to Soften Water of Various Degrees of Hardness

'Hardness' of Water	Approximate Amount of Solution of Trisodium Phosphate Needed (1 lb. to 1 qt. of water)			'Approximate Amount of' Trisodium Phosphate Crystals Needed to Soften 100 Gallons	
	1 gal.	16 gal. (large Tub)	100 gal.		
3	1/4 teaspoon	4 teaspoons	8 Tablespoon	2 Tablespoons	"
5	3/8 "	6 "	12 "	3 "	"
7	1/2 "	8 "	16 "	4 "	"
10	3/4 "	12 "	24 "	6 "	"
12	7/8 "	14 "	28 "	7 "	"
15	1 1/8 "	18 "	36 "	9 "	"
20	1 1/2 "	24 "	48 "	12 "	"
25	1 7/8 "	30 "	60 "	15 "	"

2/ All material presented following this point is for the use of the store buyer and those particularly interested in the training of the consumer.

- d. Method of testing to determine whether the hard water is softened sufficiently. Use water as softened according to directions given in "c") and fill small bottle (described in "b") one half full of water and add two drops of soap solution. Then, shake the bottle vigorously. This should produce suds which form an unbroken layer over the top of the water and remain that way for one minute by the clock. If more soap solution is needed to produce desired suds, it means that the water is not softened sufficiently. By a little experimentation the exact amount necessary can be determined.

Suggestion for Group Demonstration by Home Economists or other Leaders. Have each woman bring from her own home a jar of water which she uses for washing. Determine the degree of hardness of it and also the amount of trisodium phosphate solution necessary to soften 1 gallon. Be prepared to supply:

- a. 2 or 3 ounce bottles.
- b. Standard solution of soap.
- c. Dissolved trisodium phosphate crystals -- 1 pound to 1 qt. of water.

As a result, each woman will be able to soften water at her own home.

Use of Washing Soda to Soften Water

The use of washing soda is very satisfactory to soften water which is not very hard. Follow directions usually given on the container in which it is purchased or same general procedure as is given for trisodium phosphate in order to determine the amount of washing soda needed to soften a given amount of water.

Use of Lye in Softening Water

Lye, or caustic soda, is as the name indicates a caustic chemical and must be handled with intelligent precautions in order to avoid any disastrous contact with the skin especially around the face and eyes or with clothing. Lye is an efficient water softener, but because of the great hazards in using it, lye is not recommended for use except for those who will observe proper precautions. Notwithstanding the danger in the use of lye, families are reported to be using it instead of trisodium phosphate because the latter is not so commonly known and available in general stores at bulk prices. A concentrated solution may dissolve or disintegrate clothes and shoes. Even the fumes (fine dust or spray resulting when dissolving lye in water) or a diluted solution may prove very dangerous to the skin and eyes. It may be fatal. It is the wise precaution to wear rubber gloves while handling lye.

Method of Determining Amount of Lye Needed to Soften the Water

- a. Preparation of Lye-softening Solution. Use an earthenware container, often called stoneware, of at least 1/2 gallon capacity, preferably a gallon, with a mouth about the size of the top of a lye can. A stone container with a larger mouth can be used if a heavy cardboard top is fitted into the mouth and a circular hole no larger than the top of the can of lye is cut into it. (Caution: Do not use container of glass, enamel, wood, or other material in the place of stoneware because the

hazard in handling the lye in such a container is much greater.) Put 2 pints of water into an earthenware container and add one can of lye holding the open can upright over the hole taking every precaution against "fumes" escaping into the room or the solution spilling out in the process of "boiling". After the lye is completely emptied remove it, put its cover on and also put a heavy paper or cardboard over the opening into the stone container. When the lye has stopped fuming, stir the lye-softening solution with a stick or wooden spoon in order to prevent the lye settling and forming a solid crystal coat on the bottom of the container. The lye-softening solution is now ready for use in softening water. It is a very strong solution and will seriously eat into both skin and clothing. Store away beyond the reach of children and animals.



- b. Determining the Amount of Lye-softening Solution Needed to Soften Water. Put 1 gallon of hard water into a 2 gallon stone container. To this add 1 teaspoon of lye-softening solution and allow to stand 3 days. During this time, the lye in the softening solution will unite with the "hard" elements in the water to form a precipitate which will settle to the bottom of the container. When the water is softened as completely as can be effected, the hard elements will be precipitated and will settle to the bottom.

Test this softened water by the use of red litmus paper to determine (a) whether there is any presence of free lye, or (b) whether the water is sufficiently softened. Litmus paper can be purchased at a drug store at very little cost. If the red litmus paper turns blue the test indicates that there is too much free lye present. In this case add hard water, cup by cup, stirring thoroughly and allowing it to stand until the precipitate of hard elements settles. Continue testing with red litmus paper, after making each addition of a known quantity of hard water, until the water no longer turns the red litmus paper blue. Upon the basis of the above experiment calculate the amount of water which 1 teaspoon of lye-softening solution will soften.

When the red litmus paper does not change color it indicates either (a) that the correct balance has been obtained between lye and hard water, or (b) that there is an insufficient quantity of lye used to "completely" remove the hardness of the water. In which case more lye softening solution in ~~very small~~ quantities, drop by drop, must be added until the red litmus begins to turn bluish. Corrections should be made in the calculation of the amount of lye needed to soften the water.

In order to accurately check the results of the experiment and the calculations as to the amount of lye needed to soften the water, repeat the experiment using 5 gallons of water and the amount of lye as

calculated by the directions given above for softening one gallon of water. Continue experimentation if necessary.

- c. Regular Softening of Hard Water. After having determined the amount of lye-softening solution needed to accurately soften a given amount of water, whether it is 1 gallon or 5 gallons, it is a simple matter to soften large enough quantities to have soft water on hand at all times.

Obtain 3 water tight wooden kegs or barrels, each large enough to hold 2 or 3 days supply of softened water. The known amount of water in each barrel is softened by adding the correct amount of lye-softening and allowing it to stand for three days before using to allow time for the chemical reaction to be completed between the lye and hard elements of water and for the sediment to settle to the bottom of the barrel. Then as soon as the softened water in the first barrel has been used, the sediment at the bottom of the barrel should be removed, the barrel washed out, and refilled with hard water to which the correct amount of lye-softening solution is added. It, too, must stand at least 3 days. Repeat with each barrel as soon as softened water is used.

Water in the same well varies in degree of hardness at different times. An occasional test with litmus paper of the softened water is desirable to check upon the amount of lye needed.

Suggestions for Group Demonstration and Discussions by the Home Economist or Other Leaders

- 1. Demonstrate preparation of lye-softening solution (page 4 - a)
- 2. Prepare before the meeting 1 gallon water in which 1 teaspoon of lye-softening solution has been put and allowed to stand 3 days. Demonstrate use of red litmus paper in determining the softening of the water (page 4 - b) and calculate the amount needed to satisfactorily soften the water.
- 3. Discuss with group the precautions necessary to follow in order to safely use lye.
 - a. Be sure stone container is free from cracks and imperfections because it may easily break in making lye-softening solution.
 - b. Keep lye out of reach of children.
 - c. Use rubber gloves while handling lye.

Buying Soap by Specifications

A complete list of Federal specifications for all types of soap can be obtained from the Superintendent of Documents, Washington, D.C.

Following are briefs of Federal specifications of two types of soap:

- a. Chip and powdered)
- b. Laundry) for laundry purposes

Soap - Chips and Powdered:

Federal Specifications P-S-596, Powdered Laundry Soap, and P-S-566, Chip Soap, are suitable for laundry purposes and dish washing in softened water.

In selecting chips and comparing prices, the following points should be evaluated:

1. The percentage of dry soap should be at least 85% of the total weight for chip, and 93% for powdered. In other words, water and other volatile matter should not exceed 15% for chip and 7% for powdered soap.
2. Free alkali should not exceed 0.5% of the total weight.
3. Insoluble material should not exceed 0.5% of the total weight.
4. Lathers well in hot water. (Titer of mixed fatty acid prepared from soap should not be less than 39°C - Federal specification)

In comparing samples, the cost per pound of the soap should be calculated upon the basis of the actual percent of the weight of the chips which is dry soap (not water). For example: soap flakes which are 92% dry soap selling at \$0.10 per pound really cost \$0.108 per pound, while soap flakes 63% dry soap at \$0.08 cost \$0.0909 per pound.

Laundry Soap: (Federal Specification P-S-591)

"Ordinary laundry soap shall be a well-made uniformly mixed laundry or common soap, made from soda and fats, with no excessive proportion of rosin and a moderate amount of matter insoluble in alcohol; shall be free from "make weights" and shall be suitable for use with moderately hard water for general cleaning and laundry purposes."

1. The odor should not be objectionable as received or in a hot solution of soap and water.
2. The percentage of dry soap should be at least 64%.
3. Free alkali should not exceed 0.5%.
4. Matter insoluble in water should not exceed 1%.
5. Rosin should not exceed 25%.

Special Assignments

The following materials under the sections "Special Assignments" and "Suggestions for Group Discussions" are suggestive of important and related points which the membership will find valuable when considering the subject of buying soap. Many additional inquiries will come to the mind of the members and leaders. For later reporting and discussion, questions can be assigned to individuals, to committees or to the study groups as a whole, depending upon the judgment of leaders and interest of membership.

The success of any meeting, whether it is a training school for leaders or a membership study and discussion group, is found in the intensity and character of interest resulting. This may be expressed in changes in practices and habits of individuals. It may appear in a desire to get further information from other sources. It may take the form of actively participating in a constructive cooperative program.

Where can a consumer obtain valuable information about the buying of soap and water softeners?

1. Select an issue of a local newspaper, a farm magazine, a popular woman's magazine. Go through the advertisement and underscore words or phrases which give definite information of value to you in selecting and using soap or water softeners. Count the number of words in advertisement and the number of words you underscored. What is the significance of this?
2. Study a mail order catalog for information which will help you in the intelligent selection of soap. Compare claims printed on the labels of soap and water softeners which are sold in your store with the advertisements found in magazines and papers. Where do you get the most useful information?
3. What information do you want your stores to give you about soap and water softeners? Do you want it on a label, in printed instructions or given you by lecture and demonstration?

What can you as a consumer do in testing soap and water softeners?

4. Weigh a bar of soap you are now using. Shave a small portion into thin flakes. Add 1/2 teaspoon of flakes to 1 pt. of water in 1 qt. jar and shake vigorously. Observe whether a sud is found which will stand up for one minute. If not, repeat process until desired lather is formed. Compare this result with like experiments on other soaps.
5. Continue doing your washing as usual without softening the water. Keep track of amount of soap used and also the weight and degree of dirtiness of clothes washed. Do your next washing using softened water, keeping similar records and compare results.

What can you do as a consumer to help your store-keeper stock the soap and water softeners which you need?

6. Keep him advised as to your use-requirements for soap and water softeners. Have each member make out the form "
7. Estimate what the increase in your dividend might be if your cooperative store should save 1/2 cent a pound in buying its soap by specifications based upon your "use-requirements" rather than by "brands."

Suggestions for Group Discussions at a Later Meeting

1. What kind of soap have you found most satisfactory? Prove your position by records kept of (a) amount of soap used, (b) its cost, and (c) life of garments washed.
2. Both as an individual consumer and as a member of a group, how can you best help your storekeeper select the soap which will give the best results?
3. What washing practices have been found most satisfactory in your locality (a) from practical home experience, (b) from research at the state college of Agriculture and Home Economics?
4. The desirability of using a washing machine is accepted as desirable by most homemakers. Discuss possibilities of getting one, or the use of one.
5. Home-made soap can be made from alkali and equally good as the good commercial soap. Discuss how this can be done and supplement it with a demonstration. Various manufacturers of commercial lye provide directions for soap making and in some cases furnish a demonstrator where a group requests one.

